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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/533,496

04/29/2005

Jens Martin Paulsen

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Hartford, CT 06103

EXAMINER

NGUYEN, KHANH TUAN

ART UNIT

PAPER NUMBER

1796

NOTIFICATION DATE

DELIVERY MODE

03/18/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

usptopatentmail@cantorcolburn.com

Office Action Summary	Application No. 10/533,496	Applicant(s) PAULSEN ET AL.	
	Examiner KHANH T. NGUYEN	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/24/2008 and 10/29/2008</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Amendment

1. This application is a 371 of PCT/KR03/02304 (filed on 10/30/2003). The preliminary amendment filed on 04/29/2005 is entered and acknowledged by the Examiner. Claims 1-17 are currently pending in the instant application.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

The Applicant benefits the priority date filed on 10/31/2002.

Information Disclosure Statement

3. The information disclosure statements (IDS) filed on 10/24/2008 and 10/29/2008 have been considered. An initialed copy accompanies this Office Action. The listing of references in the specification, at pages 3-7, is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Drawings

4. The drawing(s) filed on 04/29/2005 has been considered.

Specification

5. The disclosure is objected to because of the following informalities: At page 15 of the specification, in line 7, the phrase "In this invention he bulk..." should be replace with --In this invention the bulk...--. Appropriate correction is required. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

6. Claims 13, 14, 15, and 16 are objected to because of the following informalities:
- Regarding claims 13, 14, and 16, the phrase "and/or" renders the claims indefinite because it has an alterative meaning which does not positively identify the claims limitation. Claim 15 is missing a period a the end of the claimed sentence. Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the average transition metal " in lines 4-5. There is insufficient antecedent basis for this limitation in the claim.

Claims 1, the term "average transition metal" in the instant claim at lines 4-5 is a relative term which renders the claim indefinite. The term " average transition metal" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Appropriate correction is required.

Claims 2-8, 11-12, and 16 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: the range of integer z in the instant claims. To expedite prosecution z is considered to be greater than or equal to 0.0 and less than or equal to 1.0.

Claims 2-5 and 7-17 are indefinite based on their dependency to claims 1 and 6 for the same reasons set forth above.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 1796

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

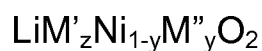
Claim Interpretation: Claim 1 recites a multi-layered powder transition metal compound comprising at least 85% w/w of a transition metal (e.g. Li, Mn, Ni, and Co) and oxygen (i.e. oxides), wherein the core material (i.e. inner bulk around the center of the powder particle) and the outer layer (outer bulk) compositions differ by at least 10% and the total composition of the core material (inner bulk) includes about 50% of the total number of transition metal atoms of the powder particle.

Claim Interpretation: Claim 6 recites a multi-layered powderous lithium metal oxide having a lattice within the r-3m group and comprising at least 90% w/w of a metal having a formula $M=(Mn_{1-u}Ni_u)_{1-y-z}Co_y$ in a transition metal, wherein the core material (i.e. inner bulk around the center of the particle) and the outer layer (outer bulk) compositions differ by at least 10% and the total composition of the core material (inner bulk) includes about 50% of the total number of transition metal atoms of the powder particle.

Please Note. The transitional term “comprising”, which is synonymous with “including,” is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., > Mars Inc. v. H.J. Heinz Co., 377 F.3d 1369, 1376, 71 USPQ2d 1837, 1843 (Fed. Cir. 2004).

10. Claims 1-8 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. 2002/0192552 A1 (hereinafter refer to as Lampe-Onnerud).

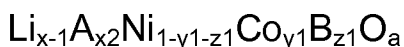
Lampe-Onnerud teaches a powder composition useful as a cathode material in rechargeable lithium battery [0038] that includes a multi-layered powder (See Fig. 5 and Fig. 6). Lampe-Onnerud teaches a core material having an empirical formula:



wherein about $0.1 \leq x \leq$ about 1.3, about $0 < y \leq$ about 0.5, and about $0 < z \leq$ about 0.2; M' is at least one member of the group consisting of Na, K, **Ni**, Ca, Mg, and Sr; and M'' is at least one member of the group consisting of **Co**, Fe, **Mn**, Cr, V, Ti, Mg, Si, B, Al

Art Unit: 1796

and Ga (Abstract and [0006]). Optionally, the core material can be a material having an empirical formula:



where about $0.1 \leq x1 \leq$ about 1.3, about $0 < x2 \leq$ about 0.2, about $0 < y1 \leq$ about 0.2, about $0 < z1 \leq$ about 0.2, and $1.5 < a <$ about 2.1; A is at least one member of the group consisting of Ba, **Mn**, Ca, and Sr; and B is at least one member of the group consisting of B, Al, Ga, **Mn**, Ti, V, and Zr (Abstract and [0007-0008]). The transition metal oxide core material of Lampe-Onnerud is considered to be the inner bulk around the center of a multi-layered compound having about 50% of the total number of transition metal, including Co, Ni and Mn, of the particle. Lampe-Onnerud further teaches the core can be coated with a coating that has a greater ratio of cobalt to nickel than the core (Abstract and [0037]). Lampe-Onnerud teaches both the core and coating composition each have the above empirical formula [0048] and has a hexagonal lattice within the R-3m group [0038]. Lampe-Onnerud suggests that the ratio of cobalt to nickel increases as a gradient from the core to an outer surface of the coating [0042] to provide more cobalt at the surface than at the core of the powdered based material [0073]. In other words, the transition metal oxide core is coated with a transition metal oxide wherein the core material and outer coating differ in the ratio of cobalt to nickel. Thus, the powdered compound of Lampe-Onnerud is expected to have a core and an outer coating with a different transition metal oxide composition since the ratio of cobalt to nickel increases as a gradient from the core to the outer surface of the coating [0042]. Furthermore, the oxide compound of Lampe-Onnerud primarily consist of transition

Art Unit: 1796

metals including Co, Ni, and Mn and oxygen, therefore said oxide compound is expected to have at least 85% w/w or more of transition metal and oxygen.

Although Lampe-Onnerud does not expressly suggest the core material and the outer coating having a different transition metal composition in a specific amount, e.g. at least 10% or at least 15%, it would have nonetheless been obvious to the skilled artisan to produce the claimed powderous lithium metal oxide compound because it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the proportions of the ratio of cobalt to nickel between the core material and the outer coating of Lampe-Onnerud through routine experimentation, since Lampe-Onnerud suggested increasing the ratio of Co:Ni as a gradient from the core to an outer surface of the coating [0042]. Thus, discovering the optimum or workable weight ratio of transition metal oxide material between the core and the outer layer involves only routine skill in the art.

11. Claims 9-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pub. 2002/0192552 A1 (Lampe-Onnerud) as applied to the above claims, and further in view of U.S. Pat. 6,416,903 B1 (hereinafter refer to as Fierro).

Lampe-Onnerud teaches the powder composition useful in rechargeable batteries [0038] can be prepared by coating the core material by a non-reacted precursor from lithium and cobalt precursors in a molten or dissolved state, i.e. dissolved in a solution [0073]. However, Lampe-Onnerud failed to explicitly teach or

Art Unit: 1796

suggest at least one solution of dissolved hydroxide of carbonate salts added to particles acting as seeds as recited in the instant claims.

In an analogous, Fierro teaches a method of making a core-shell positive electrode particle (Col. 5, lines 29-52) useful in rechargeable batteries as suggested by Lampe-Onnerud (Col. 3, lines 55-63). The method of Fierro includes a first active positive material (i.e. core material) coated with a second active material (i.e. outer crust) having a mass that is 10% or greater than the total particle mass (or have a different but similar compositions with a compositional difference of 1 to 25 atom%) as suggested by Lampe-Onnerud teaches with a **precipitation method** (Col. 2, lines 42-50; Col. 4, lines 18-22; Col. 4, lines 33-38; Col. 5, line 20 to Col. 5, line 52). The first active positive material of Fierro is considered as the claimed composition M1 and second active positive material of Fierro is considered as the claimed transition metal composition M2. Like Lampe-Onnerud, Fierro teaches the first and second active material may include **Ni, Li, Co, and Mn** (Col. 6, lines 16-32). Fierro teaches the method wherein an active or core seed material (M1) such as metal sulfate solution, MeSO_4 , is exposed to a precipitation of a second MeSO_4 solution (M2) to form an outer coating (Col. 10, lines 30-50; Col. 12, line 59 to Col. 13, lines 25). Fierro teaches three or more layers of active material may be produce by adding a succeeding precipitation reaction (Col. 13, lines 6-12).

Lampe-Onnerud and Fierro reference are combined because both teach a multi-layered powder useful in rechargeable battery. Therefore, it would have been obvious to a skilled artisan at the time the invention was made to product the powder of Lampe-

Art Unit: 1796

Onnerud by the method suggested by Fierro in order to enhance the electrochemical properties of the inner material (core) without degradation of aggregate electrochemical properties (Col. 7, lines 8-14).

In view of the foregoing, the above claims have failed to patentably distinguish over the applied art.

Other Prior Art Cited]

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. JP 2002-145623 to Kazuhara et al. teaches a positive active material useful in secondary (rechargeable) lithium battery containing a lithium compound expressed by a general formula $\text{LiNi}_x\text{Mn}_{1-x-y}\text{M}_y\text{O}_2$ wherein M includes cobalt, $0.3 \leq x \leq 0.65$ to provide a stable R-3m rhombohedron structure, and $0 \leq y \leq 0.2$ (See Abstract and [0021]).

Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHANH T. NGUYEN whose telephone number is (571) 272-8082. The examiner can normally be reached on Monday-Friday 7:00-4:00 EST PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone

Art Unit: 1796

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Kopec/
Primary Examiner, Art Unit 1796

/KTN/
Examiner
03/11/2009